

## 7.0 NATURAL RESOURCES MANAGEMENT

Conserving undeveloped areas of high biological value on MCAS Miramar is a high priority in all ongoing planning efforts. As such, the Station has been recognized for its natural resources efforts. The Secretary of the Navy awarded MCAS Miramar a Superior Achievement award for the Natural Resources Conservation Installation award competition in 1998 and 2000.

A Comprehensive Natural Resources Management Plan (Kellogg 1994) was developed for the U.S. Navy to provide guidance for natural resources management on NAS Miramar. A number of specific management plans were incorporated and appended into that 1994 Natural Resources Management Plan, including the Fish and Wildlife Management Plan (USFWS 1993a), Outdoor Recreation Management Plan (NAS Miramar 1991), and Vernal Pool Management Plan (Bauder and Wier 1991). MCAS Miramar updated the 1994 plan in its Integrated Natural Resources Management Plan (MCAS Miramar INRMP 2000).

All of these previous plans are updated and incorporated into this INRMP for implementation. The *Fireroad/Fuelbreak Maintenance Plan and Standard Operating Procedure* (NAS Miramar 1992), as updated in 2004 (MCAS Miramar Fire Department), is a separate plan that is referenced, but not incorporated into this INRMP.

### 7.1 Natural Resources Goals

This chapter presents policies, objectives, and projects necessary for MCAS Miramar to achieve the Marine Corps' natural resources management goals in support of Station military readiness requirements. These goals, as set forth in MCO P5090.2\_, are as follows:

- preserve access to air, land, and sea spaces to meet military readiness requirements;
- comply with applicable laws governing the protection of natural resources;
- provide for public enjoyment of lands under the control of the Marine Corps, provided such access does not conflict with military readiness requirements and does not harm sensitive natural resources managed by the Marine Corps; and
- participate in regional ecosystem partnerships, provided such participation does not conflict with military readiness requirements and does not harm sensitive natural resources managed by the Marine Corps.

Natural resource management goals specifically adopted by MCAS Miramar are as follows:

- support the MCAS Miramar military mission by ensuring compliance with applicable environmental laws and regulations;
- include natural resource management as a component of planning for execution of Marine Corps operational requirements;
- identify and select opportunities for maintaining biodiversity, including conservation of important plants and animals; and
- secure regulatory agency and public recognition of Marine Corps environmental stewardship efforts.

Department of Defense policy directs that each INRMP must address resource management on all lands for which the installation has real property accountability, including lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. Additionally, DoD policy authorized that installation commanders may require tenants, lessees, permittees, and other parties to accept responsibility for performing appropriate natural resource management actions as a condition of

their occupancy or use<sup>1</sup>.

As such, all MCAS Miramar actions will consider natural resource management policies and objectives of this INRMP for all lands of MCAS Miramar. As new real estate and permission documents are developed and as modifications to existing permissions are prepared, the clear applicability of this guidance in the context of the entire INRMP will be reinforced. Natural resource management actions outlined in this INRMP will be planned and executed on all applicable lands of MCAS Miramar. Where applicable, this will include lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission following necessary coordination.

This chapter's purpose is to describe integration of management and conservation of natural resources to support military operational requirements of the Station. Objectives and projects presented in this chapter were developed and prioritized to support the Station's approach to natural resource management, as discussed in Chapter 5, and planning needs, as discussed in Chapter 6.

## 7.2 INRMP Projects

INRMP projects within this chapter are summarized by general topics (e.g., Special Status Species Management, Vernal Pool Management, Fish and Wildlife Management). Each general section has one or more objectives. Under each objective are applicable **In-house Management Actions**, **Projects in Progress**, **Must Fund Projects**, and **Other Planned Projects** in a very abbreviated format (project title and its project implementation year(s)).

**Must Fund Projects** are either budget class 0 or 1; **Other Planned Projects** are either budget class 2 or 3. Full implementation of this INRMP includes implementing all Must Fund Projects. DoD Instruction 4715.3 describes funding classifications that pertain to Must Fund Projects (Class 0 and Class 1) and Other Planned Projects that are not required to meet INRMP implementation status (Class 2 and Class 3). Section 9.1.1, *Funding Definitions* describes the budget classification system.

Must Fund Projects and Other Planned Projects within each general topic are budget items entered into the Marine Corps CompTRAK budget system. Section 9.4, *INRMP Implementation Funding* integrates implementation of this INRMP with the budget process.

Must Fund Projects and Other Planned Projects identified in this chapter (and Chapter 9) are described in a more detailed, standardized format in Appendix D. All actions and projects (In-house Management Actions, Projects in Progress, Must Fund Projects, and Other Planned Projects) are summarized in tabular format in Appendix E to provide a means of monitoring overall INRMP implementation.

## 7.3 Vegetation Management and Soil Conservation

Watershed, floodplain, fuelbreak/fire management, grounds maintenance and landscaping, and soil conservation are components of this subsection. Meeting objectives of each of these components requires an integrated approach to vegetation management as well as other natural resources components identified in this chapter. Plant Special Status Species and vegetation management specifically for these species are addressed in Section 7.4, *Special Status Species Management*.

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<sup>1</sup> Assistant Deputy Under Secretary of Defense (Environment, Safety, and Occupational Health) Memorandum for the Deputy Assistant Secretary of the Army (Environment, Safety, and Occupational Health), Deputy Assistant Secretary of the Navy (Environment), Deputy Assistant Secretary of the Air Force (Environment, Safety, and Occupational Health), and Director, Defense Logistics Agency of 17 May 2005 on the subject of Implementation of Sikes Act Improvement Amendments: Supplemental Guidance concerning Leased Lands.

### **7.3.1 General Vegetation Management and Soil Conservation**

#### **7.3.1.1 Policy and Background**

Effective vegetation management and associated soil conservation are critical to maintaining, restoring, and rehabilitating native vegetation and its associated wildlife habitats. When vegetation management is focused on habitat improvement for wildlife, it should include maintenance of wildlife corridors and habitat linkages. An example of ongoing habitat maintenance on the Station is the informal policy of discouraging the removal of snags (standing dead trees) and logs. Whether left standing or laying on the ground, these materials provide valuable wildlife habitat. The maintenance and restoration of training lands is an equally important aspect of general vegetation management and soil conservation.

#### **Invasive Plant Management**

MCAS Miramar must comply with Executive Order 13112, *Invasive Species*. An invasive species is defined as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health” (Executive Order 13112). Federal agencies are to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. Invasive plants can be a serious threat to natural plant communities. These species can change the structure of a plant community and degrade its value for wildlife and native plant species.

MCAS Miramar has been identifying and controlling invasive plant species, for example pampas grass (*Cortaderia* spp.), tamarisk (*Tamarix* spp.), and arundo (*Arundo donax*). The priority for species controls changes due to changing threats associated with invasive species, effectiveness of ongoing control, cost/benefit factors, and available control resources. There are 22 species under contract for control with additional species to be added as needed.

#### **General Vegetation Management**

Quantitative descriptions of vegetative attributes, such as cover, biomass, or composition, are helpful for habitat condition or trend monitoring, a planned management objective. Monitoring allows for periodic review of ecosystem quality and management objective success. The Natural Resources Division updated its vegetation/landcover mapping, producing a report that included information on vegetation changes since 1994 (O’Leary *et al.* 2002) and an updated geospatial information system (GIS) database. This vegetation database will require updates on an approximate 5-year basis; however, the next update has been postponed due to the extensive Cedar Fire burn that occurred in Oct 2003.

The MCAS Miramar Fire Department, in coordination with Natural Resources Division, is evaluating the use of native grass seeding for erosion control on fuelbreaks and the effects of such grasses on wildland fire fuel management. In 2002 five native grass test plots were established for this evaluation. Prescribed burning was to occur on these plots, but the 2003 Cedar Fire burned through the plots before the planned burn. In June 2004 these plots were prescribed burned. The evaluation is continuing.

#### **Long-Term Ecosystem Monitoring**

MCAS Miramar has implemented a Long-Term Ecosystem Monitoring (LTEM) program of vegetation and soil conditions. Results of the initial year (1999) field studies for both flora and fauna were summarized (Varanus Biological Services, Inc., and San Diego Natural History Museum 2003<sup>2</sup>) and are available for baseline comparisons.

O’Leary (2003) summarized results of the vegetation component of the LTEM program, which included the

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<sup>2</sup> J.L. O’Leary, San Diego State University, provided the vegetation evaluation.

following:

- development of a sampling procedure and initial data collection on 75 permanent vegetation plots;
- relocation and resampling of 59 vegetation plots sampled in 1993-94;
- establishment and sampling of 16 additional vegetation plots situated within an array of trap sites established for monitoring herptofauna;
- detailed site descriptions, information on disturbance activities and erosion, location directions, photographs, and maps recorded on a standard plot map form;
- collection, pressing, identification, and mounting of new plants found on the Station;
- individual summaries of the compositional, structural, and site characteristics of the 75 plots sampled in 1999;
- contrasts between summaries of each major vegetation type sampled in 1993-94 with those sampled in 1999; and
- a discussion of vegetation management implications.

O'Leary (2003) evaluated changes in vegetation between 1993-94 and 1999 and concluded, *None of the changes detected on individual sample plots appear attributable to U.S. Marine military readiness activities.*

LTEM special purpose plots are placed in specific sites to provide information on management issues. For example, the Natural Resources Division has established LTEM special purpose plots (Section 7.3.1, *General Vegetation Management and Soil Conservation*) in areas for controlled burns or wildfire corridors to monitor long-term effects to vegetation and soil conservation.

### **Soil Erosion and Revegetation**

Soil erosion can severely delay the re-establishment of vegetation and habitat conditions needed to sustain plant and wildlife species. This is of particular concern when Special Status Species habitat is the focus of habitat improvements. Soil erosion also affects the maintenance of training lands, which require vegetative cover for training realism.

The Soil Conservation Act provides for the application of soil conservation practices on federal lands. MCAS Miramar (as are all Marine Corps installations) is required to manage its lands to control and prevent soil erosion and preserve natural resources by conducting surveys and implementing soil conservation measures. Erosion control is meant to preserve the integrity of soil productivity and function. It encompasses water quality concerns and protection of riparian functions that affect water quality. Altered or degraded landscapes and associated habitats are to be restored and rehabilitated whenever practicable (MCO P5090.2\_).

Erosion and sedimentation issues are important at MCAS Miramar due to highly erodible soils and above normal fire risk throughout most of the year. Excess sediment or altered flows can affect watershed hydrologic function, water quality, and wildlife habitat. Watershed malfunction that results in excessive runoff can degrade or even destroy whole ecosystems, individual plant communities, or specialized zones, such as riparian areas. Gullies can lower the water table, potentially affecting vegetative cover and the hydrology of an entire watershed. Roads can alter water flow and potentially divert water from natural streams.

A soil erosion inventory of the Station was completed in 1991 (Kellogg and Kellogg 1991). Of 287 erosion sites described, 51 were classified as active and 32 with minor activity. Almost three-quarters of the sites were natural landslides off eroded ridges in East Miramar. The greatest manmade erosion hazards on the Station were wide, unvegetated fuelbreaks without water diversion devices (Kellogg 1994).

In 2004-05 URS (2005) inventoried undeveloped portions of the Station on a landscape level to assess, document, and prioritize active erosion sites and provide recommendations for restoration of priority erosion sites. Erosion sites were classified into the following categories: sheet, rill, gully, channel, and mass wasting/landslide; sites were further categorized as natural or accelerated by human-induced processes. URS identified 98 sites with erosion problems; 68 contained gullies. Rills were identified at 19 sites; channel erosion at 8 sites; streambank erosion at 6 sites; slumps at 5 sites; and mass wasting was recorded at 12 sites.

Site prioritization was based on the following: 1) sites that potentially affect Station training needs, 2) sites that potentially affect Station facilities, 3) sites that potentially affect Station cultural/biological resources, and 4) sites that affect Station maintenance projects. URS (2005) completed detailed erosion restoration recommendations for 18 priority erosion sites. These recommendations are adaptable to other erosion sites with the same erosion classification. Current effort involves establishing restoration project programming and implementation efforts for these recommendations.

During 1999-2001 field work was conducted for a Public Works Division project to locate restoration sites for coastal sage scrub, grasslands, and wetlands. This study (Johnson *et al.* 2003) identified 102 restoration sites encompassing 598 acres.



*Slope Restoration - Fish Pond Natural Resources Division*

MCAS Miramar has instituted several restoration projects for restoration of coastal sage scrub habitat due to its regional rarity and importance to the threatened coastal California gnatcatcher.

- In 1997 the restoration of 0.143 acres was begun to mitigate for impacts from the removal of one abandoned Land Vehicle Tracked (Personnel) 5. Methods involved using a berm to protect the area and allowing natural revegetation (Heffernan 1999).
- In 1999 the restoration of 87.5 acres was begun to mitigate for impacts

from construction associated with BRAC realignment. Methods involved burning, irrigation, ripping and tilling, mulching, and local seed to grow seedlings for transplanting (Heffernan 2002).

- In 1999 the restoration of 3.16 acres was begun to repair damage caused by fuelbreak maintenance operations. Methods involved straw flake erosion control dams and seedling plantings from local stocks, follow-up weed control, and irrigation (Johnson 2003a).
- In 1999 restoration of 0.6 acres was begun to mitigate for impacts associated with repair and improvements to the Ammunition Road leading to the Flightline. Methods involved seedling plantings from local stocks, follow-up weed control, and irrigation. This project also included a study of the effects of soil compaction on seedling survival (Johnson 2003b).

Beginning in 2001 three eroded sites associated with the Fish Pond were restored (Green *et al.* 2001). This project is complete, and the pond is open for patron use (Section 7.7, *Natural Resources-related Outdoor Recreation Management*).

### **Agricultural Outleases**

As part of the integrated management of natural resources, installation commanders should review the

suitability of their lands for agricultural leasing, under the Military Construction Authorization Act, when this practice is compatible with military requirements. Installation commanders should also review the suitability of existing leases given existing and planned future military requirements (MCO P5090.2\_, para. 11104 2.c). The Naval Facilities Engineering Command, Southwest acts as the Marine Corps agent for outleasing.

About half of the rental revenue from outleases on MCAS Miramar is authorized by Headquarters Marine Corps for use in implementing this INRMP (as identified in below project descriptions that are identified as agricultural funded). The Miramar Wholesale Nursery agricultural outlease contains a Soil and Water Conservation Plan with provisions for the lessee to undertake, including control soil erosion and noxious/undesirable weeds within the lease area. The outlease also allows for conservation and maintenance work directed by the government on a cost reimbursement basis through rent credit. The Station's natural resource management includes lease areas as part of its overall management program without distinction based on boundaries.

In recent years agricultural outleases have provided an important funding mechanism for such MCAS Miramar projects as updating soil erosion inventory, vernal pool habitat surveys and studies, LTEM, vegetation mapping, rare plant surveys, and minor restoration project plant materials. Natural resources project management support and agricultural outlease management support from the Naval Facilities Engineering Command, Southwest are also funded by receipts from this program.

### **Watershed and Floodplain Management**

MCAS Miramar avoids direct or indirect development of floodplains and restores and preserves natural and beneficial values served by floodplains as it implements land management, construction, and land use actions, as required by Executive Order 11988, *Floodplain Management* and outlined by MCO P5090.2\_, para. 11104 2.g. This approach serves to prevent flood damage to facilities.

Watershed management preserves soil and water productivity and function. Erosion and water quality management approaches on MCAS Miramar use best management practices approved by the State of California under the Non-Point Source Pollution Control Plan.

Smith and Lichvar (2001) conducted a Station-wide planning level delineation of aquatic resources, mapping of floodplains, and a functional assessment of riparian ecosystems at MCAS Miramar. The study accomplished the following:

- identified Waters of the United States to help address jurisdictional requirement(s) of Section 404, CWA, regulated water bodies, and aquatic resources;
- mapped the 100-year return period floodplain; and
- provided a baseline assessment of riparian integrity for the 116 riparian “reaches” on the Station.

In addition, effective watershed management can be achieved through fire management, erosion control programs, and assessments of impacts of surface runoff into watersheds. Maintaining riparian vegetation cover through invasive plant removal and fire protection are watershed management actions that contribute to water quality by preventing siltation into streambeds (*e.g.*, minimizing new surface drainage into canyons).

The 2003 Cedar Fire demonstrated the potential for substantial damage to riparian systems. Damage occurred in riparian areas from (1) riparian vegetation loss, (2) siltation from the adjacent slopes during rainfall events, and (3) higher water volumes during rainfall events that eroded channels and banks more than normal. A project was initiated in 2004 by the Miramar Public Works Division to mitigate some watershed damage caused by the fire and to prevent or minimize downstream flooding and sedimentation. Sedimentation barriers

and plantings of riparian vegetation are being installed in West Sycamore and San Clemente canyons.

Green Farm earthen dam was repaired in 2003 to reduce risk of dam failure, which could have impacted the new Rifle/Pistol Training Range Complex and federally endangered willow monardella plants downstream. In 2002 MCAS Miramar began stabilizing and revegetating a slope of Homestead Dam (Tierra Data 2003); the project is in progress.

#### ***7.3.1.2 Objective(s) and Planned Actions***

**Objective 1:** Develop and implement a program for natural land and habitat restoration and rehabilitation.

##### ***In-house Management Actions:***

- Provide specifications for reseeding/revegetation of sites disturbed by Station activities.

##### ***Projects in Progress:***

- Homestead Reservoir Slope Repair.
- Slope Stabilization/Erosion Repair following the Cedar Fire for two ammunition magazines to be completed in 2009 (Public Works Division project).
- Coastal Sage Scrub Restoration Project (R-33) to be completed in 2007.

##### ***Must Fund Projects:***

- Invasive Species Control (MI55353) to be done annually.
- Minor Projects/Damage Repair (MI25555) to be done annually, as needed.
- Agricultural Outlease Management (MI99006) required annually.

##### ***Other Planned Projects:***

- Vegetation Mapping (MI85555) to be initiated in 2008.
- Restore Eroded Areas (MI0600002) to be initiated in 2006 and 2010.

**Objective 2:** Continue the Long-Term Ecosystem Monitoring program of vegetation and soil conditions on MCAS Miramar.

##### ***Must Fund Project:***

- Long-term Ecosystem Monitoring (MI95556) to be initiated in 2007.

**Objective 3:** Maintain watershed productivity, quality, and functioning through an effective non-point source pollution control program (soil erosion control and maintenance of vegetative cover). Emphasize seasonal distribution of water availability, minimization of flooding, reduced sedimentation, and maintenance of wetland quality performing planned actions in other compatible management areas.

##### ***In-house Management Actions:***

- Identify potential effects of actions in floodplains early in the NEPA planning process.
- Monitor stormwater discharge outfalls, annually (Environmental Engineering Division action).

### ***Project in Progress:***

- Post-Cedar Fire Watershed Restoration/Stabilization in San Clemente and West Sycamore Canyons to be completed in 2008 (Public Works Division project).

## **7.3.2 Wildland Fire Management**

### ***7.3.2.1 Policy and Background***

The primary reason for fire management at the Station is the protection of human life, health, and property. Proper land and vegetation management aids in suppressing and reducing damage from wildland fires, which helps maintain watersheds and, thereby, water quality.

Potential ignition sources on and off the Station create risks from wildfire. Management is needed to support emergency response control efforts to reduce the likelihood of catastrophic wildfires, which can cause significant loss of resources. The MCAS Miramar Fire Department is responsible for fire management on the Station. Fire Department wildland fire managers work with the Public Works Division and Environment Management Department to maintain fuelbreaks and access roads.

The management of vegetation to meet fire management needs and soil/vegetation conservation will be evaluated jointly between wildland fire managers and the Station Natural Resource Division. Ideally, plans and actions should be directed to avoid grading or blading the soil beyond maintenance of an access road width with the remainder maintained by vegetation crushing, mowing, or prescribed burning. Where vegetation is cleared down to mineral soil on steep slopes, water bars or other diversion structures need to be placed at regular intervals to minimize soil erosion.

The *Fireroad/Fuelbreak Maintenance Plan and Standard Operating Procedures* (MCAS Miramar Fire Department 2004), which replaced the *Fuelbreak Management Plan* (NAS Miramar 1992), includes new information on sensitive natural resources and more details on the maintenance of fuelbreaks and fireroads on the Station. This plan emphasizes the cutting of vegetation to maintain fuelbreaks, instead of using heavy equipment to expose bare ground. Most fireroads are normally 15 feet wide unless they are within a fuelbreak when they are 20 feet wide with a 50-foot fuelbreak on each side. The Natural Resources Division maintains a GIS database on prescribed fire and wildland fire burn boundaries; these GIS data were used to help develop the *Fireroad/Fuelbreak Maintenance Plan*.

The Station is evaluating the use of native grass seeding for erosion control on fuelbreaks and the effects of such grasses on wildland fire fuel management (Section 7.3.1, *General Vegetation Management and Soil Conservation*). Based on an evaluation of non-essential fuelbreaks and fireroads, revegetation/restoration of a steep, severely eroded portion of fire access road R-15 began in 2003 and continues.

The Fire Department accomplishes necessary coordination and subsequent burning activities involving prescribed burning. Maintenance of existing fuelbreaks and fire access roads where there is no expansion beyond the existing impact footprint should meet NEPA compliance via a Categorical Exclusion and would require no additional environmental documentation. Actions that must expand footprints of managed fuelbreaks would require natural resource impact assessment and further NEPA documentation. Other access roads should be addressed separately, based on their primary purpose.





*Flightline Control Burn      Natural Resources Division*

Past fire management at MCAS Miramar has included fuelbreak maintenance and prescribed fire. A prescription is written that articulates specific objectives for burns. In 1989 and 1990 more than 1,000 acres of brush were control-burned. Additional fuel modification has occurred as a result of burning since 1990. Recent wildfires have accomplished some fuel management objectives. Between 1990 and 2000 roughly half of the easternmost portion of the Station, east of the rifle range, has burned (MCAS Miramar INRMP 2000). The Cedar Fire burned

approximately 17,600 acres in fall 2003 (see Section 4.8, *Cedar Fire*).

The Miramar Fire Department includes prescribed burning as one of several fuel management tools that will support fire and resource management objectives identified in the Station Fire Management Planning and this INRMP. Prescribed burn plans contain measurable objectives and a predetermined prescription, an escaped fire contingency plan and receive environmental review. The wildland fire management planning contains policies and guiding principles of fire management for all wildland acres within the Air Station boundary, including an element that all fire management activities will support and enhance ecosystem sustainability and the interrelated ecological, economic, and social components on a landscape scale.

Hunsaker and Awbrey (1999) studied the effects of fire on the Station using 12 study sites. This study showed the effects of a moderate intensity fire. The study indicated that unburned vegetation within general burn areas was important for ecosystem recovery. Cobb (2005) is studying the effects of wildfire on vernal pool habitat vegetation and fairy shrimp (see Section 7.5.1, *Vernal Pool Habitat Management*).

Fire can have a positive impact on native vegetation and wildlife habitat. Fire management helps maintain ecological diversity by fostering a mosaic of successional stages and age classes of vegetation types. The primary benefit of patchy mosaics to fire control is to lower the age class of vegetation, thereby lessening fuel load and buildup of the duff layer. The resulting fire pattern is one of more frequent, small fires instead of the high risk of a large, disastrous fire.

While wildfire typically occurs on MCAS Miramar each year, fire in any one area is typically much less frequent (*i.e.*, approximately every 20 years or more). Besides fire protection, there are many benefits to wildlife from periodic wildfire, including improved edge effects, water yields, and reduced erosion. Better understanding of the effects of fire on vegetation and wildlife habitat can come from tracking and monitoring effects of fuel load modifications, prescribed burns, and wildfires.

The Natural Resources Division has established LTEM special purpose plots (Section 7.3.1, *General Vegetation Management and Soil Conservation*) in representative controlled burn and wildfire areas to monitor long-term effects to vegetation and soil conservation. Long-term monitoring will provide information into the effects of fire on vegetation and wildlife habitat.

### **7.3.2.2 Objective(s) and Planned Actions**

**Objective 1:** Support a Wildland Fire Management Program to protect high value human and natural resource areas from catastrophic wildfire while conserving resources and military operational flexibility.

#### ***In-house Management Actions:***

- Provide technical, natural resource-based support to the Fire Department for wildland fire management planning.
- Revegetate a severely eroded portion of fire access road R-15 (jointly with Public Works Division and Fire Department).

#### ***Project in Progress:***

- Wildland Fire Management Plan and Environmental Assessment anticipated to be completed by 2006 (Miramar Fire Department lead).

**Objective 2:** Track and monitor effects of fires and fuel modifications to support hazardous fuel reduction actions in strategic areas of MCAS Miramar and enhance/maintain native plant diversity and improve wildlife habitat.

#### ***In-house Management Action:***

- Maintain an up-to-date GIS database of past fires and other fuel management activities.

### **7.3.3 Grounds Maintenance and Landscaping**

#### **7.3.3.1 Policy and Background**

Grounds maintenance and landscaping includes weed control. It is Marine Corps policy that environmentally and economically beneficial landscaping practices be used, per Executive Order 13148 and as outlined in a Presidential Memorandum (26 April 1994). The Presidential Memorandum directs federal agencies to:

- use regionally native plants for landscaping;
- design, use, or promote construction practices to minimize adverse effects on the natural habitat;
- prevent pollution by reducing fertilizer and pesticide use, using integrated pest management, recycling green waste, minimizing runoff, and similar practices;
- implement water efficient practices; and
- create outdoor demonstrations incorporating native plants and other similar practices.

A “native plant” occurs naturally in a particular region, ecosystem, and/or habitat without direct or indirect human actions (60 FR 40840).

Other laws, orders, directives, policies, and regulations that affect grounds maintenance and landscaping on MCAS Miramar include:

- **Executive Order 13148**, *Greening the Government Through Leadership in Environmental Management*, which also addresses the use of “environmentally and economically beneficial landscaping;”
- **Executive Order 13112**, *Invasive Species*, which requires preventing the introduction of and controlling invasive species;
- **National Invasive Species Management Plan** (2001), which include DoD goals to prevent and control invasive species as well as restore lands with native species;
- **DoD directives 4715.1 and 4715.3**, which require military services to protect, preserve, and restore the natural environment using regionally native plants for landscaping; and
- **MCO P5090.2**, which implements the above laws, orders, and directives.

The Natural Resources Division has distributed copies of Presidential Memorandum and Executive Order 13148 to personnel in charge of Station landscaping plans. Lists of regional native plants suitable for the landscaping and sources for procurement have been provided to Station personnel involved with landscaping and can be provided to others upon request.

The Environmental Management Department reviews and recommends changes to Station landscaping plans for compliance with the above legal instrumentalities. MCAS Miramar uses invasive plant control programs to control spread of invasive landscaping plants into natural areas (also see Section 7.3.1, *General Vegetation Management and Soil Conservation, Invasive Plant Species*).

In many locations on MCAS Miramar, species protected by the ESA occur in the immediate vicinity of developed areas. Persons should consult with the Natural Resources Division prior to clearing natural vegetation. Persons should also coordinate with the Natural Resources Division prior to tree/brush trimming and removal during the breeding season of birds to ensure that they do not remove limbs/trees that support active bird nests (Section 7.5.3, *Migratory Bird Management*). Pesticide application must be coordinated with the Station pesticide management coordinator and should be part of an integrated pest management approach (Section 7.6.4, *Integrated Pest Management*).

Persons responsible for mowing around the runways and parking aprons should be aware that, in many locations, there are Special Status Species in the immediate vicinity of the runways. This is particularly true in the case of vernal pool basins and watersheds that support such species. Mowing taller grasses around runways tends to attract birds that can become a Bird and Animal Air Strike Hazard (BAASH). This circumstance requires that special planning be done to avoid or minimize damage to Special Status Species and that BAASH hazards are kept at a minimum. The flightline mowing program has been coordinated with the USFWS<sup>3</sup> (Section 7.6.3, *Wildlife Damage Management*). MCAS Miramar has reviewed and revised the flightline mowing program standard operating procedures to maintain consistency with BAASH program and vernal pool habitat endangered species management requirements (Section 7.5.1, *Vernal Pool Habitat Management*).

### 7.3.3.2 Objective(s) and Planned Actions

**Objective:** Ensure that grounds maintenance and landscaping operations are consistent with natural resource goals and objectives.

#### ***In-house Management Actions:***

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<sup>3</sup> Bird Air Strike Hazard Prevention Program Mowing Operations, NAS Miramar (1-6-94-I-33) dated 14 January 1994.

- Provide technical support for invasive landscape plant control (as needed).
- Provide technical support for the flightline mowing program (annually).
- Provide technical support for weed/exotic plant control on the airfields to Public Works, Facilities Maintenance.

## 7.4 Special Status Species Management

### 7.4.1 Policy and Background

Special Status Species include those that are federally listed as endangered or threatened, or proposed candidates for such listing (refer to Table 4.6). Definitions for categories of Special Status Species are provided in Section 4.6, *Special Status Species*. MCAS Miramar’s approach to Special Status Species is to proactively collect information on presence or absence, location, habitat availability and suitability, and life history requirements to support planning for military operational requirements and habitat conservation.

MCAS Miramar consults with the USFWS (as appropriate) to ensure that Marine Corps actions are not likely to jeopardize the continued existence of any endangered or threatened species in compliance with sections 7 and 9 of the ESA. Pursuant to Section 7 of the ESA, federal agencies, such as the Marine Corps, must consult with USFWS if their action “may affect” a federally listed endangered or threatened species (50 CFR 402). Such consultations may be formal or informal (Section 6.1.2.1, *Endangered Species Act*).

The 2000 INRMP (MCAS Miramar INRMP) addressed ESA requirements associated with the Biological Opinion for the Realignment of Naval Air Station Miramar to MCAS Miramar (USFWS 1996a). The current INRMP carries forward the applicable and ongoing management commitments made by this action, such as having a plan for multi-species conservation.

#### 7.4.1.1 Critical Habitat Considerations

The Endangered Species Act was revised via the National Defense Authorization Act of 2004, which states that, “*The Secretary [of the Interior] shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.*” The USFWS has determined that, where applicable, federal critical habitat designation is not warranted if the INRMP includes the following three criteria<sup>4</sup>:

##### 1. *The plan provides a benefit to the species.*

Cumulative benefits of the management activities identified in a management plan, for the length of the plan, must maintain or provide for an increase in a species’ population or the enhancement or restoration of its habitat within the area covered by the plan [*i.e.*, those areas deemed essential to the protection of the species]. A benefit may result from



*San Diego Mesa Mint* Natural Resources Division

<sup>4</sup> As stated in, Office of the Under Secretary of Defense. October 10, 2002. Memorandum. *Implementation of Sikes Act Improvement Act: Update Guidance*.

reducing fragmentation of habitat, maintaining or increasing populations, ensuring against catastrophic events, enhancing and restoring habitats, buffering protected areas, or testing and implementing new strategies.

**2. The plan provides certainty that the management plan will be implemented.** Persons charged with plan implementation are capable of accomplishing objectives of the management plan and have adequate funding for the management plan. They have the authority to implement the plan and have obtained all necessary authorizations or approvals. An implementation schedule (including completion dates) for the management effort is provided in the plan.

**3. The plan provides certainty that the management effort will be effective.** The following criteria will be considered when determining the effectiveness of the management effort. The plan includes (1) biological goals (broad guiding principles for the program) and objectives (measurable targets for achieving the goals); (2) quantifiable, scientifically valid parameters that will demonstrate achievement of objectives and standards for these parameters by which progress will be measured are identified; (3) provisions for monitoring and, where appropriate, adaptive management; (4) provisions for reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of quantifiable parameters) of the management effort are provided; and (5) a duration sufficient to implement the plan and achieve benefits of its goals and objectives.

Land use planning strategies (*i.e.*, the incorporation of essential habitat<sup>5</sup> into high priority management areas [Section 5.1, *Management Areas*]), flora and fauna inventory and monitoring, habitat management, wildlife management, Special Status Species management, and numerous other projects discussed in this INRMP will provide a cumulative benefit to federally listed species. Most essential habitat identified by the USFWS for species on MCAS Miramar is in areas identified in this INRMP as level I or II MAs, which focus on management of these resources (see Table 5.1).

The MCAS Miramar Commanding Officer has the authority to implement the plan, which will be accomplished by the Environmental Management Department staff, as scheduled and budgeted. Formal adoption of an INRMP by the installation commander constitutes a commitment to seek funding and execute, subject to the availability of funding, all Must Fund Projects and activities in accordance with specific timeframes identified in the INRMP. Under the Sikes Act, any natural resources management activity that is specifically addressed in the plan must be implemented (subject to availability of funds). Failure to implement the INRMP is a violation of the Sikes Act and may be a source of litigation (USMC 2004). Annual reporting on implementation of the current INRMP to both the USFWS and CDFG has documented the commitment of MCAS Miramar to acquire funding and implement the INRMP.

Goals, objectives, and long-term ecosystem needs, based on land use sustainability for the MCAS Miramar military mission, have been analyzed and considered extensively in collaboration with persons contacted while preparing this plan. Marine Corps and MCAS Miramar goals are defined for the plan as a whole (Section 1.4), and objectives with specific project are established within the plan (chapters 7 and 9 and appendices D and E). Each project has standards by which success will be monitored. Monitoring will occur within Environmental Management Department on a regular basis, as described in Section 1.1.3, *Reviews*,

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<sup>5</sup> The final determination of critical habitat for the endangered plant spreading navarretia included a definition of “essential habitat” (FR 70, No 200, p. 60662; 18 Oct 2005). The text states, “The Service in this and other notices has been using the term “essential habitat” as shorthand for “areas eligible for designation as critical habitat.”” It further states, “The use of the term “essential habitat” in this and past notices is not a determination by the Service or the Secretary that this habitat is, within the terms of the Act, essential to the conservation of the species, unless the use of the term is accompanied by an expressed statement that the Secretary has made such a determination.”

### *Approvals, and Revisions.*

Critical habitat has been proposed or designated for five threatened or endangered species that occur on MCAS Miramar. Critical habitat has been proposed for the coastal California gnatcatcher (USFWS 2003b), San Diego fairy shrimp (USFWS 2003a), and willowy monardella (USFWS 2005c). Final critical habitat designations have been made for the Riverside fairy shrimp (USFWS 2005a) and spreading navarretia (USFWS 2005b). While essential habitat was identified on MCAS Miramar, lands on the Station, in all cases, were excluded from critical habitat designation rules for these species based on the Station having a legally operative INRMP (MCAS Miramar INRMP 2000).

This INRMP is an update of the 2000 INRMP and continues the protection and benefits afforded to all threatened and endangered species present on MCAS Miramar, as outlined below.

- Development and use of Management Areas focused on differing resource types and sensitivities to guide management and planning afford protection to high concentrations of listed species and essential habitats. Associated guidance attempts to limit activities, minimize development, and mitigate actions in areas supporting high densities of vernal pools, listed species, and other wetlands and managed activities and development in areas with low densities, or no special status species and sensitive habitat. For example, 77.2 percent of proposed essential habitat identified for the California gnatcatcher and 86.0 percent of essential habitat proposed for the willowy monardella occur within Level I and II MAs, which are focused on the management of vernal pools and non-vernal pool threatened and endangered species (see Table 5.1). These same MA Levels I and II include a high proportion of the vernal pool habitat, including 84.2 percent of proposed essential habitat for the San Diego fairy shrimp, 82.5 percent identified for Riverside fairy shrimp, and 100.0 percent for spreading navarretia.
- General management actions include restoring degraded sites, restricting access to sensitive areas through fencing/signage, training military personnel to recognize and avoid sensitive areas via incorporated natural resources instructions in the Station training order, distributing sensitive resources maps and brochures to Station personnel, invasive/exotic species removal, removal of unlawfully dumped trash, surveys to identify areas suitable for habitat restoration/enhancement, habitat compensation for unavoidable impacts from Station projects to ensure no net loss of habitat value, plant and animal surveys for listed and rare species, and long-term ecosystem monitoring of both plant communities and selected wildlife.



*Fairy Shrimp* Natural Resources Division

Specifically regarding the ***San Diego fairy shrimp***, measures completed, being conducted, and planned for 2006-2010 for the San Diego fairy shrimp on MCAS Miramar, as described in below sections 7.4.1.2, *Federally Listed Species*, 7.4.2, *Objective(s) and Planned Actions*, and 7.5.1, *Vernal Pool Management* have and will continue to appreciably benefit the species. These actions have and will also continue to appreciably benefit other federally listed species found in vernal pool habitats (*i.e.*, endangered San Diego button-celery, California Orcutt grass, San Diego mesa mint, Riverside fairy shrimp, and threatened spreading navarretia). Past, ongoing, and

planned actions include protective fencing along Ammo Road, vernal pool units Z1-3, HH3+, U19, U-15, F-North, I-7, X1-4; trash removal (more than 250 tons); a Vernal Pool Burn Study (2000-present); contracted work to identify areas suitable for habitat restoration and re-establishment; posting signage to delineate vernal pool areas adjacent to Station activities; exotic plant removal vernal pool unit AA10; a



study of *Agrostis avenacae* occurrence in vernal pools and options for control; Vernal Pool Surveys (~1989-2007, 2009); and successful completion of all field work meeting BRAC 1995 vernal pool mitigation commitments with an additional surplus to bank.

- Specifically regarding the ***coastal California gnatcatcher***, measures completed, being conducted, and planned for 2006-2010 for the coastal California gnatcatcher, as described in below sections 7.4.1.2, *Federally Listed Species* and 7.4.2, *Objective(s) and Planned Actions* have and will continue to appreciably benefit the species. Past, ongoing, and planned actions include Habitat Evaluation, Home Range Determination and Dispersal Study (1993-1996); coastal sage scrub restoration site survey; study for effects of helicopter noise on the coastal California gnatcatcher (final report in preparation); Station-wide population surveys (conducted 1998-2001, 2004, planned for funding 2006 and 2008); and completion of field work meeting BRAC 1995 commitments to restore 87 acres of coastal sage scrub habitat.
- Specifically regarding ***willow monardella***, measures completed, being conducted, and planned for 2006-2010 for willow monardella, as described in below sections 7.4.1.2, *Federally Listed Species* and 7.4.2, *Objective(s) and Planned Actions* have and will continue to appreciably benefit the species. Past, ongoing, and planned actions include partial surveys prior to listing, Station-wide baseline survey (2002), establishment of monitoring plots (2003) and re-surveying of plots (2004 and 2005), and willow monardella habitat enhancement project (funded in 2006).

#### 7.4.1.2 Federally Listed Species

Table 4.6 summarizes information on federally listed species on MCAS Miramar. The six Special Status Species dependent on vernal pool habitat at MCAS Miramar are described in Section 4.3, *Vernal Pool Habitat*. Surveys for fairy shrimp and vernal plants on MCAS Miramar are ongoing (e.g., Black 2004c). About 19% of vernal pool habitat on Station has been intensively surveyed since 2000 to document species presence and precisely map the pools and their associated watersheds. Surveys have largely been focused in operationally important areas of the Station. Future surveys are scheduled and all vernal pool habitat on MCAS Miramar will be surveyed within the next four years. Basin and watershed delineation, associated species inventories, invasive species assessment, and associated GIS data provide resource information for appropriate habitat management.

Lepidoptera surveys were conducted on MCAS Miramar from 1995 to 1998 and in 2000 that looked for Quino checkerspot butterfly. To date, no confirmed Quino checkerspot butterfly sightings have been reported on Station. Due to recent sighting of this species adjacent to the Station in areas burned by the Cedar Fire, new surveys for this species on MCAS Miramar are proposed as a planned action.

A post-Cedar Fire, Station-wide survey for the coastal California gnatcatcher was completed in 2004 (Bitterroot Restoration Incorporated 2005). This survey will be repeated on about 3-year intervals.

Effects of helicopter operations at MCAS Miramar on the coastal California gnatcatcher were studied by Awbrey and Hunsaker (2000). They found that take-off and landing maneuvers may pose a physical threat (egg and/or chick displacement from nests) only to gnatcatcher nests within 100 meters. Effects of overflights on nesting birds were variable, and overflights at 1,500 feet only partially masked calls. Hunsaker *et al.* (1994, 1995, 1997, 2000) evaluated coastal California gnatcatcher habitat and home range. They provided management information regarding habitat requirements, fire, invasive plants, and Station operations. Section 7.3.1, *General Vegetation Management and Soil Conservation* describes these efforts on the Station.

In 1998 a breeding least Bell's vireo was found on the Station for the first time. Surveys for the endangered

least Bell's vireo were conducted on MCAS Miramar in 2001/2002 with similar results. Willow flycatchers have been observed on the Station, but the southwestern willow flycatcher subspecies was not observed (Varanus Biological Services, Inc. 2003). Monitoring surveys for these species are planned to occur at 3-year intervals, following a delay while the habitat regrows following the Cedar Fire, which consumed most sites used by breeding vireos.

MCAS Miramar supports a large proportion of the known population of the endangered plant, willow monardella. Under contract for the Station, Rebman and Dossey (2006) completed a Station-wide survey for this plant and developed a long-term monitoring program for this plant on MCAS Miramar. The survey located 3,379 individual plants in 393 occurrences in six watersheds with active populations (a seventh watershed had three dead plants). Data collection from long-term monitoring plots will enable more accurate assessments of population trends for this species on the Station. Pre-Cedar Fire willow monardella sites have shown regrowth during post fire monitoring surveys. A majority of the locations were burned by the October 2003 Cedar Fire.

Recent surveys have documented intermixed populations of Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), Eastwood manzanita (*Arctostaphylos glandulosa* ssp. *zacaensis*), and hybrids between the two subspecies in East Miramar. Approximately 30% of manzanita occurrences on station are Del Mar manzanita. MCAS Miramar is an overlap zone for these subspecies. The Cedar Fire appears to have benefited the manzanitas by opening chaparral and sage scrub canopies, which provided more available resources for observed vigorous manzanita regrowth. In August 2005 MCAS Miramar awarded a contract to develop a long-term monitoring plan, establish permanent monitoring plots, and conduct a population census for the Station Del Mar manzanita population. This contract is scheduled for completion in August 2006. Based upon the finalized plan, the Station will pursue a monitoring program.

#### **7.4.1.3 Other Species of Special Regional Concern**

Other Species of Special Regional Concern at MCAS Miramar have been defined to include former candidates for federal listing as threatened or endangered, species of concern to the state of California, and species that are regionally rare or of limited distribution (refer to Table 4.7). These species and their habitats are considered as part of MCAS Miramar's general vegetation and wildlife management program.

MCAS Miramar is having the Station surveyed for 17 rare and endangered plant species. This 4-phase project has three completed phases (Rebman and Dossey 2002, Tierra Data Inc. 2004, and Saucedo-Ortiz and Scheid 2005); the final phase should be completed by 2007. Other site-specific surveys are also used to update MCAS Miramar Special Status Species, such as the "G" (Teacup) parcel survey in 2001 (Ecological Restoration Service) and surveys conducted in support of planning for the Military Family Housing environmental impact statement. As a result, the entire Station has been surveyed or is under contract for survey of *Acanthomintha ilicifolia*, *Arctostaphylos glandulosa* ssp. *crassifolia*, *Baccharis vanessae*, *Chorizanthe orcuttiana*, *Fremontodendron mexicanum*, *Ambrosia pumilla*, *Adolphia californica*, *Artemisia palmeri*, *Ceanothus verrucosus*, *Chorizanthe polygonoides* ssp. *longispina*, *Comarostaphylis diversifolia* ssp. *diversifolia*, *Dudleya variegata*, *Ferocactus viridescens*, *Githopsis diffusa* ssp. *filicaulus*, *Harpagonella palmeri* var. *palmeri*, *Muilla clevelandii*, and *Quercus dumosa*.

The Natural Resources Division uses station-wide e-mails, brochures, and quarterly training classes to create and promote awareness of natural resources to Station personnel of the sensitivity, values, and obligations regarding the conservation of Special Status Species and their habitat.

#### **7.4.2 Objective(s) and Planned Actions**

Section 7.5.1, *Vernal Pool Habitat Management* includes actions and projects that affect Special Status



Species. Similarly, projects below that involve vernal pool habitat also affect resources described in Section 7.5.1.

**Objective 1:** Proactively maintain up-to-date presence/absence, distribution, and habitat data for all Special Status Species to support project and activity planning, management, and implementation on MCAS Miramar.

***In-house Management Actions:***

- Maintain lists of species of regional concern to monitor status and address in NEPA reviews.
- Use various media to create and maintain awareness of Station personnel of the sensitivity, values, and obligations regarding the conservation of Special Status Species and their habitat. This may include presentations, briefs, newspaper articles, special messages, and an information brochure.

***Projects in Progress:***

- Vernal Pool Resources Surveys (3,760 basins) to be completed by 2007.
- Non-Vernal Pool Rare and Endangered Plant Surveys (West Miramar) to be completed by 2006.
- Willowy Monardella Long-term Trend Plot Monitoring data collection to be completed by 2006.
- Endangered Del Mar Manzanita Long-Term Monitoring Program Development to be completed by 2007.
- Vernal Pool Resources Surveys (about 1,600 additional) to be completed by 2008.

***Must Fund Projects***

- Presence/Absence California Gnatcatcher Surveys (MI37405) to be initiated in 2006 and 2008.
- Endangered Least Bell's Vireo/Willow Flycatcher Surveys (MI97016) to be initiated in 2007 and 2010.
- Non-Vernal Pool Endangered Plant Monitoring (MI0500005) to be initiated in 2008.
- Vernal Pool Surveys (MI0NR03) to be initiated in 2009.
- Endangered Quino Checkerspot Butterfly Survey MI10NR09 to initiated in 2010.

**Objective 2:** Proactively manage Special Status Species habitat.

***In-house Management Actions:***

- Identify, map, and selectively field mark sites supporting endangered species likely to be affected by Station operations.
- Produce sensitive resource GIS maps for Station staff to reference (updated every 6 months).

***Must Fund Project:***

Section 7.3.1, *General Vegetation Management and Soil Conservation* has a project, Invasive Species Control (MI55353), that is important to this objective as well.

***Other Planned Project:***

- Endangered Willowy Monardella Habitat Enhancement (MI0600003) to be initiated in 2006.

**Objective 3:** Monitor to ensure ESA Section 7 compliance, as set forth in existing biological opinions, for projects implemented or actions taken.

### ***In-house Management Action:***

- Monitor internal MCAS Miramar compliance commitments.

## **7.5 Vernal Pool Habitat and Other Wetland Management**

This section addresses vernal pool habitat and other wetlands on MCAS Miramar which are described in greater detail in Chapter 4. Special Status Species dependent on vernal pool habitat at MCAS Miramar are described in Section 4.3, *Vernal Pool Habitat*. The San Diego button-celery, California Orcutt grass, San Diego mesa mint, Riverside fairy shrimp, and San Diego fairy shrimp are listed as endangered, and spreading navarretia is listed as threatened.

Other wetlands include vernal marshes, fresh water marshes, portions of some riparian vegetation types, and edges of open water ponds. Management and use of these areas requires careful consideration of the CWA, ESA, and the national policy (Executive Order 11990, *Protection of Wetlands*) to permit no overall net loss of wetlands.

### **7.5.1 Vernal Pool Habitat Management**

#### **7.5.1.1 Policy and Background**

##### **Previous Plans**

Previously prepared and relevant documents for the management of vernal pool habitat at MCAS Miramar include the 2000 INRMP (MCAS Miramar INRMP 2000), NAS Miramar Vernal Pool Management Plan (Bauder and Wier 1991) and *The Ecology of Southern California Vernal Pools* by Zedler (1987). Relevant contents of these management plans have been incorporated into this INRMP.

The NAS Miramar Vernal Pool Management Plan (Bauder and Wier 1991) was prepared almost 15 years ago for a Naval Air Station with a different mission than that of MCAS Miramar. Since that time boundaries have changed, more accurate inventories have been conducted, technology has progressed, and the science of vernal pool management has progressed. The current INRMP contains portions of the NAS Miramar Vernal Pool Management Plan that remain applicable for continuing management of vernal pool habitat on the Station.

##### **Early Surveys**

Two vernal pool habitat surveys were conducted in 1979: one for CDFG (Beauchamp and Cass 1979) and the other for Pardee Construction Company (Villasenor and Riggan 1979). Both surveys included many vernal pool areas not on the then NAS Miramar, and neither survey included the entire Station. Beauchamp and Cass (1979) mapped and counted vernal pools and estimated the surface area of pools and their watershed area. They also indicated the presence or absence of nine sensitive vernal pool taxa in each pool group, the type of associated vegetation, the degree of disturbance, and the land owner. Villasenor and Riggan (1979) mapped and numbered individual pools and noted the presence or absence of 12 vernal pool taxa in each pool. In some pools, only the presence of *Pogogyne abramsii* and *Eryngium aristulatum* var. *parishii* was noted. Pool dimensions were estimated.

Beauchamp (1982) conducted a vernal pool habitat survey limited to NAS Miramar with the purpose of mapping pool areas around runways on the Main Station and on Miramar Mounds National Natural Landmark. Maps were created for all of the Station, but detailed information on plant species and pool size was provided for only six pool series (AA - a portion, EE, GA, GG, HH, and U). He noted the presence or

absence of 16 vernal pool habitat taxa and estimated pool size for these pools.

The Bauder (1986) report, compiled for CDFG, was intended to update the Beauchamp and Cass (1979) report. It surveyed all previously mapped pools and made an assessment of their condition, noted the presence/absence of sensitive taxa, and calculated the number of pools or pool areas that had been lost to development. This survey and those in 1991 are the only surveys to assess pool habitat condition in detail. Bauder made no attempt to remap pools or map newly discovered pools. In addition to these comprehensive studies, a number of more focused surveys has been conducted over the period, including Woodward-Clyde Consultants (1980), City of San Diego (1981), Patterson (1987), Steele (1988), and Michael Brandman Associates, Inc. (1988).

Differences from survey to survey in the level of detail used in mapping pools in the field and the tendency to either merge pools that are interconnected or count them separately have contributed to different numbers of pools being recorded for each pool group during 1979, 1982, 1986, and 1990 surveys. In addition, the prolonged drought from 1986 through spring of 1990 may have reduced the numbers of plants of vernal pool habitat species in a given area and, thus, made locating vernal pool habitat more difficult.

### **Management Units**

All vernal pool habitats identified on MCAS Miramar were assigned a group designation in 1991 following the system of vernal pool units and groups developed by Beauchamp and Cass (1979) for San Diego County, as supplemented by Bauder (1986). Individual clusters/groups of pools were identified by a code employing letters and numbers. Letters refer to regions or series of pools, and numbers refer to clusters/groups within regions or series. Pool groups newly mapped or renamed in 1990 were assigned codes that were followed by a “+” (Bauder and Wier 1991). Data regarding the number of pools, plant species present, characteristics of pools, and other qualities were presented in descriptive paragraphs and summarized in Table 2 and Appendix 1 of the 1991 plan (Bauder and Wier). Exhibit 4 in that plan illustrated the distribution of pool groups, sensitive species, and Management Units. This exhibit was a synthesis of all previous mapping efforts. Figure 4.3.4 of this INRMP shows current vernal pool habitat distribution and management units on MCAS Miramar.

### **Vernal Pool Habitat Damage and Other Risks**

Bauder and Wier (1991) summarized the relative likelihood of damage to vernal pool habitats via different mechanisms on a qualitative basis. The type and extent of damage visible (in 1991) at each site was used to predict future conditions unless a significant change in land use or management had recently taken place. Probability or likelihood of occurrence was coupled with an estimate of habitat restorability given the particular type of damage. For example, some events had a low probability of occurrence (*e.g.*, air crashes, toxic spills) but a high potential for inflicting serious, perhaps, irreversible damage. Conversely, dumping or mowing had a high probability of occurrence, but resulted in little irreversible damage.

Bauder and Wier (1991) described the following types of damage, either potential or realized for vernal pool habitat.

***Air Crashes*** - Although air crashes may occur infrequently, when they do happen, pools and surrounding habitat could sustain substantial damage from the impact of the plane, fuel spillage, fire, fire suppression, and the activities of emergency crews and vehicles. Crashes during the rainy season would result in greater damage due to soft soils.

***Altered Hydrology*** - The construction of roads, runways, and buildings that interrupts the normal surface and subsurface flow of water creates an altered hydrology of pool areas. Pool groups adjacent to runways and freeways are most affected. Some areas receive increased flow due to storm drains and culverts, and berms

and roads act as small dams. Other areas may be deprived of the normal flow of water. Vernal pool habitat plants are tolerant of limited periods of inundation but suffer increased mortality with increased inundation; these plants are absent from ponds and lakes that have water most or all of the year (Zedler 1987). If pools rarely retain water or have water only for short periods of time, pool species such as *Downingia* (which requires saturated or inundated soil to germinate) or *Pogogyne* (which is sensitive to competition from weedy grassland species) may be unable to persist, particularly during an extended drought period. Ripping, grading, or plowing can, in addition to destruction of habitat, decrease the propensity for water to pond by interrupting the hardpan and removing layers of clayey soils, creating “leaky bottom” pools. Vehicles usually cause longer periods of water retention (Bauder 1989a, 1989b), probably due to a combination of soil compaction and removal of soil that puts the hardpan closer to the surface.

**Dumping/Trash** - Dumping of trash refers to the accumulation of inert materials, such as wood, metal, bricks, and household goods, but not toxic materials. The likelihood of dumping is directly related to the ease of access and is generally coupled with vehicle damage.

**Fire/Fire Suppression** - Wildfires and associated activities can affect vernal pool habitat in three ways: fire suppression (vehicles, grading, chemical fire retardants), fire risk reduction (discing, grading, brushing), and the actual burning of vegetation (prescribed burns, wildland fires). Pools set in a matrix of dense chaparral have the highest risk of damage related to wildfires. Larger units of vegetation are more at risk. Consequently, the most valuable vernal pool habitat has the highest risk of fire damage or damage related to fires. Because vernal pool habitat flora evolved in a landscape subject to periodic wildfires, it ought to be able to withstand fires so long as their frequency and intensity do not differ markedly from the historical norm. Unfortunately, information is scanty on the historical nature of California wildland fires. A study by Cox and Austin (1990) indicated that fire can have at least a temporary adverse impact on *Pogogyne*. Discing and grading of pool basins or adjacent habitat for fire risk reduction could have serious and in some cases irreversible impacts on the distribution and abundance of pool species. Vehicles associated with the suppression activities would probably do less damage than discing or grading because fires tend to occur when soils are dry and hard.

**Future Projects** – Potential future projects<sup>6</sup> or altered land uses (resulting from both military and non-military sources) occurring in vernal pool habitat would have a very high probability of damaging vernal pool habitat. These types of actions could cause irreversible changes, and there is no restoration potential for the destroyed habitat. Projects that will affect nearby land may impact pools via altered hydrology, toxic spills, increased disturbance, or some other effect associated with the juxtaposition of incompatible land uses. In general, there is a direct relationship between the proximity of the proposed land use change and the likelihood of damage to pool habitat. Also, changes to land higher in the drainage increase the probability of impacts to pools as does the creation of long edges or boundaries.

**Grading** - The threat of damage due to grading, defined as soil disturbance well below the surface, includes that of approved land uses as well as grading incidental to other activities. If grading or ripping pierce the hardpan or fill pool basins with soil, pool hydrology may be permanently altered.

**Mowing and Discing** - Mowing is known to alter the competitive relationships of species, but its effect on vernal pool species is unknown. Mowing generally occurs around the runways. If mowing is done when soils are dry and annuals have set seed, damage should be minimal. Discing is defined as surface soil disturbance. The damage of such disturbances could be substantial. Even ruts in road pools differ from immediately adjacent habitat in the length of the period of inundation and the frequency of occurrence of pool species (Bauder 1989a, 1989b).

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<sup>6</sup> This discussion refers to a concept and is NOT referring to a specific list of projects being planned.

***Pedestrians and Horses*** - Although effects of foot paths and bridle trails are not as detrimental as motorized vehicles, both humans and horses can have substantial negative impacts on vernal pool habitat. Horse paths can become as wide as a road when riders travel abreast or when they detour low spots in the trail during rainy periods. Equestrian use is facilitated by the stables. Pedestrian use of the Station is restricted to authorized Marine Corps activities, such as military training, operation and maintenance activities, and field data collection. Authorized activities are generally unrestricted except for in higher security areas, including the Flightline Area and firing range surface danger zones.

***Toxics*** - Toxics can directly kill vernal pool flora and fauna and may persist in soil and water for long periods of time. The risk of damage from toxics is greatest to pools near the runways, hangars, maintenance facilities, and fuel farms. Dumping, accidental spills, or emissions incidental to normal operations would cause the most damage if materials directly entered pools. The next greatest impact would be if toxics entered a drainage and traveled through soil and water. Vernal pool flora or fauna could also be affected by the application of herbicides and pesticides.

***Vehicles*** - Other than destruction of habitat by conversion to buildings, parking lots, and roadways, vehicles pose the greatest threat to vernal pool habitat. Information evident in aerial photos and field surveys (in 1991) on the ground suggested that vernal pool habitat on NAS Miramar was steadily being degraded and destroyed. The larger the vehicle, the greater the damage, although repeated use of motorcycles over a period of years can have just as serious of an impact as a tank. If the vehicles pass through pools when soils are saturated, ruts up to 0.5 m deep can develop (Bauder 1991 personal observation). This is deeper than most natural pools (Zedler *et al.* 1979). Ruts alter the hydrology and distribution of species (Bauder 1989a, 1989b). Vehicle tires remove clayey soils on pool bottoms, reducing the soil volume available to plant roots and in some cases exposing the hardpan. Vehicle tracks will probably be evident many decades into the future, just as disc furrows from over 40 years ago can still be seen (in 1991) clearly on the Miramar Mounds National Natural Landmark (Bauder personal observation).

### **Vernal Pool Habitat Management**

Compatibility of uses within Level I MAs is discussed in Chapter 5. The vast majority of vernal pool habitat basins and watersheds are encompassed within Level I MAs on MCAS Miramar to highlight them for management and conservation. Protection of vernal pool habitat has been given the highest management priority at MCAS Miramar. Management recommendations have been, and continue to be, developed to prevent the degradation or destruction of vernal pool habitat.



*Vernal Pool Habitat Restoration*

*Natural Resources  
Division*

The 1991 vernal pool plan included (Bauder and Wier 1991, Appendix 6) prioritized lists of management recommendations for each management unit. Many of these have been accomplished; some are outdated; and some remain to be done.

MCAS Miramar committed to mitigating vernal pool habitat affected by the BRAC action (mitigation ratio 3:1, consisting of 2:1 restoration and 1:1 preservation). The biological opinion (USFWS 1996a) estimated 4.7 acres of vernal pool habitat would be damaged. The actual damage was less than authorized<sup>7</sup> (3.16 acres).

<sup>7</sup> March 1, 1999, MCAS Miramar letters, *Establishment of a Mitigation Bank on MCAS Miramar*, to USFWS, Carlsbad

MCAS Miramar Parcel G (Vernal Pool Mgmt. Unit 6, Group AA4-7) contains 2.02 acres of vernal pool habitat (Ecological Restoration Service 2001). All vernal pools in the G Parcel are to be preserved in partial fulfillment of the BRAC action preservation commitment. The remaining mitigation commitment of 1.14 acres is met by preserving 1.14 acres of the 1.78 acres of vernal pools located south of State Route 52 (Vernal Pool Mgmt. Unit 9, Groups U-15, U-19, and F16-17) to minimize effects on military activities on MCAS Miramar.

This 1991 Vernal Pool Management Plan (Bauder and Wier) includes (Appendix 7) vernal pool habitat restoration techniques (*i.e.*, decompaction, sculpting/recontouring, reseeding pools, re-establishment, invasive species removal), which have been used, and when necessary modified, to restore pools on NAS Miramar and MCAS Miramar during the past 14 years, as indicated by the following examples.

- In 1992-94, 30 pool basins were restored. This project included reconstructed mounds reseeded with inoculum from pools that were to be destroyed; it also included the removal of invasive plants in the surrounding watershed (Bauder *et al.* 2001).
- In 1997, 2.30 acres (79 pools) were restored within AA4-7, F (north), F16, U15, and U19 pool groups (Black 2000a, 2003a).
- In 1997, 2.3 acres (75 pools) were restored within Management Unit 2, X1-4, Z1-3, EE1, and HH3+ pool groups (Black 2000b, 2003b).
- In 1998-1999, 0.85 acres (69 pools) were restored within A4, AA8, AA9, and AA10 pool groups (KEA Environmental, Inc. 1999; EDAW, Inc. 2005).
- In 1999-2000 MCAS Miramar re-established/restored about 170,000 square feet of vernal pool surface in the Miramar Mounds National Natural Landmark Vernal Pool Group U (north) (Tomsovic and Macaller 2003, 2004a, and 2004b; Saucedo and Macaller 2004).

Cobb (2003) developed a restoration plan for the vernal pool habitat at the Miramar Mounds National Natural Landmark on the Station. This plan identified 124 vernal pool habitats (3.2 acres) within the Landmark that are suitable for vernal pool habitat restoration. The plan includes performance criteria and annual reporting requirements. This restoration planning methodology has value for other vernal pool habitat restoration projects in the future. In 2004, a contract was awarded to begin restoring 0.50 acres of vernal pool habitat in compensation for San Diego fairy shrimp habitat lost in association with improvements and paving of roads and lots of the Flightline Perimeter Road and Camp Elliott Warehouse Area.

The Branchiopod Research Group (2003) monitored the water quality in vernal pool habitat restored in 1998-99 (KEA Environmental, Inc. 1999; EDAW, Inc. 2005). No significant coliform bacteria or hydrocarbon contamination was found. Soil disturbance associated with pool re-establishment/restoration did not appear to increase the availability or solubility of heavy metals. Soluble levels of heavy metals were generally low, but cadmium, lead, and iron were above Environmental Protection Agency potable levels in some areas.

Cobb (2005) is studying the effects of a 2000 wildfire on 15 vernal pools using 30 unburned pools as controls. This study shows positive effects of rainfall on vernal pool habitat recovery from wildfire, both for plants and fairy shrimp. Invasive plant species numbers have increased dramatically in control vernal pools during a good rainfall year with no similar increase in invasive plant species in burned vernal pools.

Vernal pool ecosystem functionality is threatened by invasive plant species. *Agrostis avenacea* has invaded San Diego vernal pools since the 1980s and has become firmly established. This species adversely affects at least three Special Status Species. Labor-intensive, hand weeding appears to be the best option for minimizing

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Field Office (Reference 5090 5AU/NRDB/263) and U.S. Army Corps of Engineers, Regulatory Branch, San Diego (Reference 5090 5AU/NRDB/264).

effects of this species (Bauder *et al.* 2002).

The Natural Resources Division has developed a general approach to respond to and repair accidental damage to vernal pool habitat and associated threatened and endangered species and maintains a budget line item to respond to damage repair and vernal pool habitat management. The Natural Resources Division has been using field markers, signs, or fencing around vernal pool habitat groups with a higher susceptibility for damage to prevent accidental and/or unintentional damage. The Station funded a study of the effects of *Agrostis avenacea* in vernal pool habitat on MCAS Miramar. The Division uses station-wide e-mails, brochures, quarterly environmental training classes, and the INRMP to create and maintain awareness of Station personnel of the sensitivity, values, and obligations regarding the conservation of vernal pool habitat.

The Natural Resources Division is in the process of delineating isolated ephemeral wetlands and other depressions ponding water (including vernal pool habitat) during winter/spring. This effort was started in 1999 and has included about 3,600 acres of the Station with more than 3,900 basins surveyed. It is part of an ongoing program to map vernal pool habitat and its watersheds. It is being accomplished both as specific survey projects and using other projects that require vernal pool habitat mapping, such as the survey of Parcel G for possible transfer to the USFWS (Ecological Restoration Service 2001).

Section 4.3.4, *Vernal Pool Habitat at MCAS Miramar* describes the 2005 survey of 3,760 basins, which resulted in the mapping and surveying of 46.52 acres of basins. About 2,600 acres were completely surveyed for all vernal pool resources.

#### **7.5.1.2 Objective(s) and Planned Actions**

Section 7.4, *Special Status Species Management* includes actions and projects that affect vernal pool habitat. Similarly, projects below that involve Special Status Species also affect resources described in Section 7.4.

**Objective 1:** Take proactive action to prevent damage to vernal pool habitat.

#### ***In-house Management Actions:***

- Continue resource conservation and protection awareness efforts.
- Produce GIS maps of sensitive resources that show vernal pool habitat and associated watersheds for distribution to Station planners (updated about every 6 months).
- Field mark vernal pools or groups with a reasonably high likelihood for accidental damage by Marine Corps activities.
- Work continuously with project and activity planners to avoid or minimize impacts to vernal pool habitat early in the planning process using the conservation approach identified in Chapter 5 as an initial planning tool to avoid areas containing a high density of vernal pool habitat (Level I MAs).

#### ***Projects in Progress:***

- Fence the perimeter of the SANDER Parcel of the Station south of State Route 52 to reduce trespass damage, to be completed in 2005.
- Continue the Vernal Pool Burn Study (MI0NR05) through 2009.

#### ***Must Fund Project:***

- Vernal Pool Management (MI82949); ongoing, annually.

### ***Other Planned Projects:***

- Miramar Mounds Interpretative Trail (MI1000001); initiate design in 2010.
- Vernal Pool Interpretive Display (MI0900001), to be initiated in 2009.

**Objective 2:** Develop and maintain high-quality and up-to-date GIS mapping of vernal pool habitat and its watersheds that supports proactive planning and impact avoidance.

### ***In-house Management Action:***

- Maintain an up-to-date GIS database by incorporating new field survey data.

**Objective 3:** Implement a program for vernal pool habitat restoration and re-establishment to maintain no net loss of vernal pool habitat basin resources.

### ***In-house Management Action:***

- Ensure completion of BRAC vernal pool habitat restoration projects.

### ***Projects in Progress:***

- Vernal Pool Restoration and Re-establishment Surveys, to be completed by 2006.
- BRAC vernal pool habitat restoration projects (multiple), to be completed by 2006.
- Restoration of 0.53 acres of Vernal Pool Habitat in the Miramar Mounds National Natural Landmark, to be completed in 2009.

### ***Must Fund Project:***

Section 7.3.1, *General Vegetation Management and Soil Conservation* has a project, Minor Projects/Damage Repair (MI25555) that is important to this objective as well.

## ***7.5.2 General Wetland Management***

### ***7.5.2.1 Policy and Background***

MCAS Miramar supports wetlands other than the vernal pool habitat addressed above, including vernal marshes, fresh water marshes, and portions of some riparian vegetation types and edges of open water ponds. As is the case with vernal pool habitat, management and use of these areas requires careful consideration of the CWA, ESA, and the national policy (Executive Order 11990, *Protection of Wetlands*) to permit no overall net loss of wetlands.

Lichvar (2000) delineated non-vernal pool wetlands and Waters of the U.S. at Main Station, including portions of the Rose Canyon area, on MCAS Miramar. He delineated 14.9 acres of non-vernal pool wetlands and 0.26 acres of drainage ditches and intermittent stream channels in the cantonment area.

Smith and Lichvar (2001) conducted a Station-wide planning level delineation of aquatic resources, mapping of floodplains, and a functional assessment of riparian ecosystems at MCAS Miramar, as discussed in Section 7.3.1, *General Vegetation Management and Soil Conservation, Watershed and Floodplain Management*.

In anticipation of a need for non-vernal pool wetland mitigation for BRAC construction impacts, Burkhart (1999) analyzed two potential restoration sites (totaling 3.1 acres). To compensate for the 0.295 acres of



wetland actually impacted by BRAC, the Murphy Canyon site analyzed by Burkhart (1999), involving 1.03 acres, was used to meet the BRAC mitigation commitment. The second site could be used for future wetland mitigation efforts.

During 1999-2001 a contracted study was conducted for the Public Works Division to identify suitable restoration sites for coastal sage scrub, grasslands, and wetlands. This study (Johnson *et al.* 2003) identified 88.1 acres suitable for wetland restoration.

#### 7.5.2.2 Objective(s) and Planned Actions

**Objective:** Identify and manage wetlands on MCAS to maintain no net loss of wetland values.

#### *In-house Management Action:*

- Ensure compliance with existing and future Section 404 Clean Water Act permitting requirements.

#### *Must Fund Project:*

- Delineation of Non-vernal Pool Wetlands (MI97014); initiate in 2007.

### 7.6 Fish and Wildlife Management

Fish and wildlife management is defined by the Marine Corps as, “A coordinated program of actions designed to preserve, enhance, and regulate indigenous wildlife and its habitats, including the conservation of protected species and non-game species, management and harvest of game species, reduction in bird air strike hazard (BASH), and animal damage control” (MCO P5090.2\_). At MCAS Miramar, BASH is considered along with animal air strike hazard and referred to as BAASH (bird and animal air strike hazard). Topics included in this section include general wildlife management, migratory bird management, wildlife damage management (including BAASH), and integrated pest management. Pest management is included since it has potential effects on fish and wildlife, particularly the application of pesticides and rodenticides. Special Status Species of wildlife are addressed separately in Section 7.4, *Special*



Owl Box                      Natural Resources Division

*Status Species Management.*

#### 7.6.1 General Wildlife Management

##### 7.6.1.1 Policy and Background

Conservation of undeveloped areas of the Station and the habitat in those areas will protect the viability of all wildlife populations on MCAS Miramar. All species of wildlife will benefit from MCAS Miramar’s basic strategy to limit activities, avoid development, and perform mitigation actions in areas supporting high densities of predominantly vernal pool habitat, threatened or endangered species, and other wetlands. Furthermore, the basis of good management is an understanding of the diversity, abundance, distribution, population dynamics, and habitat requirements of species. This approach is reflected in the Station’s past and

ongoing biological studies. These studies include monitoring of neotropical migrant birds and surveys of Lepidoptera (San Diego Natural History Museum 2005), bats, reptiles, amphibians, small mammals, and mule deer.

Game fish species recorded as having been stocked on Miramar include largemouth bass, rainbow trout, channel catfish, bluegill, and red-eared sunfish (USFWS 1992b). The Fish Pond, after being closed to fishing since about 1990, was restored and reopened to fishing in May 2003 (Section 7.7, *Natural Resources-related Outdoor Recreation Management*).

As discussed in Section 7.7, *Natural Resources-related Outdoor Recreation Management*, MCAS Miramar has determined that it is not currently feasible to develop and implement a recreational hunting program. However, wildlife game species at MCAS Miramar include California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), brush rabbit (*Sylvilagus bachmani*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), waterfowl, and southern mule deer.

The deer population on East Miramar in 1986 was estimated at 100 to 150 animals (Hannan 1987). Spotlight surveys conducted through 1999 by the Station, show a similar deer population. Quail surveys, conducted in 1986, estimated the quail population at 900 to 2,500 on East Miramar (Hannon 1987). Subsequent 1989 quail surveys indicated they were still abundant. The mourning dove population on East Miramar in 1986 was estimated at about 500 (Hannon 1987). Coyote surveys conducted in fall 1995 estimated densities of 4.1 coyotes per square kilometer for East Miramar and 2.3 in West Miramar, noting that densities were equal to the highest published densities in North America (Mason 1998).

Hunsaker and Cox (1997, 2001) conducted a vertebrate survey on MCAS Miramar that identified 190 bird species, 36 mammal species, 25 reptile species, and 7 amphibian species. Hunsaker (1997, 2001) studied the habitat use and relative density of bats at the Station.

The Natural Resource Division has worked with Station planners and security personnel to minimize barriers to movement of large wildlife that may be created by necessary security fencing. In areas of lower security concern, devices to allow larger wildlife passage have been included in new fencing plans. However, in some areas, such as the Flightline Area, Ordnance Magazine Area, and those containing munitions of explosive concern, heightened security or safety requirements preclude provision of any openings that would allow human access.

The Natural Resources Division developed a project to identify controlled burn or other brush management areas that would be valuable for maintaining or enhancing mosaic and diversity of vegetative age classes and enhance wildlife diversity (MCAS INRMP 2000). This project was intended to complement the MCAS Miramar wildland fire management program (Section 7.3.3, *Wildland Fire Management*). However, the 2003 Cedar Fire precluded the need for this project during 2006-10.

MCAS Miramar contracted for the removal of non-native fish and amphibians from aquatic ecosystems on MCAS Miramar, in accordance with the Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990 and Executive Order 13112, *Invasive Species*. Final reporting has not been completed, but results were not effective on a long-term basis. Issues of complete removal, reintroduction, or immigration after removal of these species are very difficult to resolve.

### ***Long-Term Ecosystem Monitoring***

MCAS Miramar has implemented a Long-Term Ecosystem Monitoring (LTEM) program. MCAS Miramar and the Naval Facilities Engineering Command, Southwest developed a Cooperative Letter of Agreement

(N68711-98-LT-80055) for a LTEM program that includes a fauna component. Results of the initial year (1999) field studies for both flora and fauna were summarized (Varanus Biological Services, Inc., and San Diego Natural History Museum 2003) and are available for baseline comparisons. The fauna component includes small mammals, bats, reptiles, and amphibians. Habitat use and relative density of reptile and amphibian populations at the Station are summarized by Varanus Biological Services, Inc., and San Diego Natural History Museum (2001).

#### **7.6.1.2 Objective(s) and Planned Actions**

Note: Below projects do not include Special Status Species, which are included in Section 7.4, *Special Status Species Management*.

**Objective:** Maintain healthy wildlife populations as a component of the ecosystem.

#### ***In-house Management Action:***

- Review NEPA documentation to address wildlife conservation issues.

#### ***Must Fund Project:***

- Long-term Ecosystem Monitoring, Faunal Component (MI95556), to be initiated in 2008.

### **7.6.2 Migratory Bird Management**

#### **7.6.2.1 Policy and Background**

The primary consideration with regard to migratory birds is compliance with the Migratory Bird Treaty Act. Except as permitted, actions may not result in pursuit, hunting, taking, capture, killing, possession, or transportation of any migratory bird, bird part, or nest of any species listed in 50 CFR 10.13. Marine Corps installations must apply for depredation permits for those actions with the primary intent to capture, move, or kill migratory birds, their young, or eggs. The lawful pursuit of migratory game birds is permitted in compliance with federal, state, and local hunting regulations (MCO P5090.2 ). No hunting or trapping is currently allowed on MCAS Miramar. Section 6.1.2.3, *Migratory Bird Legal Instrumentalities* discusses specific requirements under the Migratory Bird Treaty Act.

The bird component of the LTEM program (Project - Long-term Ecosystem Monitoring, Faunal Component (MI95556), Section 7.6.1, *General Wildlife Management*) is used to monitor migratory birds on the Station in accordance with Executive Order 13186, DoD policy, and the draft Memorandum of Understanding between DoD and the USFWS for Migratory Bird Conservation (see Section 6.1.2.3, *Migratory Bird Legal Instrumentalities*). Section 6.1.2.3 outlines organizations and their respective lists of Bird Species of Concern that warrant particular consideration and monitoring in accordance with these laws. A comprehensive list, including species that may not occur on MCAS Miramar, can be viewed at <http://www.dodpif.org/site.htm?checklist.htm>.

All persons, organizations, and agencies, are liable for prosecution for violations and must follow permitting requirements for taking migratory birds. Special purpose permits may be requested and issued that allow for the relocation or transport of migratory birds for management purposes.

The following considerations are pertinent to migratory bird management.

- **Nuisance bird problems:** Exclusion of nuisance birds is the preferred method; NRD can provide technical support to those needing assistance. Installation and materials for such exclusion must be accomplished in coordination with the Public Works Division. Unfortunately, exclusion is not always possible or completely effective. Natural Resources Division biologists will assist in developing exclusion devices where bird access or nesting cause problems.
- **Injured and nuisance birds** (see Section 7.6.3, *Wildlife Damage Management*). MCAS Miramar maintains a Special Purpose Migratory Bird Permit to move and relocate birds for the purposes of transporting to a wildlife care facility, accommodating mission critical requirements, or otherwise caring for the safety of migratory birds, their young, eggs, or nests. This permit is renewed annually. The Natural Resources Division and Public Works Division have developed procedures for responding to injured or nuisance birds including active bird nests (with or without eggs or chicks). The Public Works Division maintenance trouble call system is to be used for assistance. A standard form has been developed to record data for each removal action in order to support annual permit reporting requirements.
- **Construction and Maintenance:** The approach will be to coordinate with those scheduling and performing construction and/or maintenance to avoid the breeding season, where possible. Wording in contracts and work orders will explain the law, and that it applies to all persons (not just federal agencies). A contract or work order does not authorize, encourage, or condone violation of the law, and workers are expected to comply. The Natural Resources Division has developed contractual and work order language for construction, reconstruction, and maintenance projects on the Station to minimize loss of bird nests and costly delays due to Migratory Bird Treaty Act prohibitions. This information is available for use in contracts and work orders and has been incorporated into many project specifications.

MCAS Miramar supports the DoD policy for integrating neotropical migratory bird management into existing natural resource and land management programs, consistent with the military mission. MCAS Miramar established and maintained Monitoring Avian Productivity and Survivorship stations to help determine nationwide bird demographics. This project's most recent monitoring year was 2002. Results from 1996 through 2002 are summarized by Jones & Stokes (2003). A total of 94 species were captured. Both total numbers and adult breeders show declines during poor rainfall years.

#### **7.6.2.2 Objective(s) and Planned Actions**

**Objective:** Manage migratory bird conservation compliance requirements (as discussed in Section 6.1.2.3, *Migratory Bird Legal Instrumentalities*) to minimize conflicts with military mission requirements.

#### ***In-house Management Actions:***

- Ensure that migratory bird conservation, as required by Executive Order and DoD policy, is addressed in NEPA documentation.
- Maintain the MCAS Miramar Special Purpose Migratory Bird Permit for non-readiness activities in good standing.
- Upon completion of the final USFWS rule addressing military readiness activities and applicable DoD guidance, plan and/or program for necessary monitoring requirements.

#### ***Must Fund Project:***

Section 7.6.1, *General Wildlife Management* has a project, Long-term Ecosystem Monitoring, Faunal Component (MI95556) that is important to this objective as well.

### **7.6.3 Wildlife Damage Management (Including Bird and Animal Air Strike Hazard)**

#### **7.6.3.1 Policy and Background**

MCAS Miramar's boundaries interface with both urban and natural environments. Conflicts can arise with nuisance animals (e.g., coyotes, ground squirrels, skunks, rats), which occasionally pose a health hazard. Furthermore, Special Status Species and other native wildlife are prey for some domestic animals. MCAS Miramar pest control is conducted through the Public Works Division, and if necessary, other local vector/animal control agencies. Wildlife problems previously identified at MCAS Miramar include coyotes around the stables and housing areas, sea gulls and ravens from the landfill, and interference from birds, coyotes, and deer on the runway.

Assistance with nuisance animal problems can be acquired from U.S. Department of Agriculture, Wildlife Services. In general, special permits are usually required to remove nuisance animals and can delay the response to the problem. Although leg hold traps are often the most effective technique for catching some animals, the use of body gripping traps by Wildlife Services personnel is restricted to addressing a demonstrated human health or safety problem with the concurrence of the CDFG.

The BAASH (Bird and Animal Air Strike Hazard) program is an important consideration at MCAS Miramar. Bird collisions with aircraft are a serious threat to flight safety. At MCAS Miramar, the problem has been largely with flocking species, such as gulls. Distribution and abundance of bird species that pose a potential hazard can change seasonally and also vary by altitude, temperature, rainfall patterns, and surrounding land use. The Station Safety Department has recently overseen the completion of a Bird Air Strike Hazard Assessment completed by U.S. Department of Agriculture, Wildlife Services personnel. Flightline mowing is planned to minimize the attractiveness to birds and avoid adverse effects to Special Status Species with guidance provided by the USFWS<sup>8</sup>.

City of San Diego landfill operations with regard to bird abatement have been improved in recent years, as required by the lease. Bird concentrations at the landfill are now a very rare occurrence.

Potential beneficial effects of owls inhabiting aircraft hangers have been evaluated at other air stations. Since owls are nocturnal, they are much less of a BAASH concern than other species. They may also prevent or reduce the presence of other birds and rodents from inhabiting hangars. Unfortunately, the mess created by owls living in some of the aircraft hangers on Station has created conflicts with aircraft maintenance. A variety of methods are used to resolve problems, including exclusion, harassment, and relocation. Most other birds, since they are active during daylight hours, are a greater BAASH concern.

Section 7.6.2, *Migratory Bird Management* discusses protocols for dealing with injured or nuisance migratory birds. The Natural Resources Division maintains a list of wildlife rehabilitation centers for placement of injured or abandoned wildlife. The Division also has prepared standard operating procedures for handling road-killed/injured deer and other larger animals. The feeding of wild animals is discouraged.

#### **7.6.3.2 Objective(s) and Planned Actions**

**Objective:** Reduce the potential for bird and other animal collisions with aircraft.

#### ***In-house Management Actions:***

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<sup>8</sup> Bird Air Strike Hazard Prevention Program Mowing Operations, NAS Miramar (1-6-94-I-33) dated 14 January 1994.

- Provide technical biological assistance for the Station BAASH program.
- Provide technical assistance and coordination for the flightline mowing program.
- Support coordination with the Miramar Landfill bird abatement program, as needed.

#### **7.6.4 Integrated Pest Management**

##### **7.6.4.1 Policy and Background**

Pest control includes insect, rodent, and disease management, particularly pesticide application management. Most pest management activities on Station are performed in coordination with or under the supervision of the Public Works Division. An integrated pest management plan is currently under development for the Station that will comply with applicable requirements, particularly those of the federal Insecticide, Fungicide, and Rodenticide Act. Pesticide use is to be minimized (MCO P5090.2\_). Pesticide use in support of Station natural resources management activities involves invasive plant/weed control (Section 7.3.1, *General Vegetation Management and Soil Conservation*). Sections 7.6.2, *Migratory Bird Management* and 7.6.3, *Wildlife Damage Management* of this INRMP discuss nuisance bird, wildlife, and BAASH topics associated with integrated pest management.

Africanized honey bees are expanding their range, including in the direction of MCAS Miramar; however, these bees have not been found on the Station to date. The Miramar Fire Department is the designated first responder to incidents suspected of involving Africanized honey bees. The Natural Resources Division assisted the Fire Department and Safety Division with the development of an Africanized honey bee response plan.

##### **7.6.4.2 Objective(s) and Planned Actions**

**Objective:** Comply with the federal Insecticide, Fungicide, and Rodenticide Act and minimize the use of pesticides.

##### ***In-house Management Action:***

- Provide natural resource based technical support for the MCAS Miramar Integrated Pest Management Plan.

##### ***Project in Progress:***

- Integrated Pest Management Plan for MCAS Miramar (Public Works Division project lead).

#### **7.7 Natural Resources-related Outdoor Recreation Management**

##### **7.7.1 Policy and Background**

Marine Corps policy states, “A program for outdoor recreational developments may be created in consultation with the Department of Interior and appropriate state agency. Installation Commanding Generals/Commanding Officers (CGs/COs) may execute a cooperative agreement with these agencies for the purpose of obtaining technical and consulting assistance. Installation CGs/COs are authorized to execute cooperative agreements with other state and local agencies or institutions for the exchange of information or conducting research or study projects that will contribute to the installation’s INRMP.” (MCO 5090.2\_).

Consultation with state and other federal agencies regarding outdoor recreation plans is an informal process. Also, authorization provided to execute cooperative agreements is not a mandate to do so.

A draft NAS Miramar Outdoor Recreation Tripartite Agreement was prepared in 1992. This INRMP incorporates relevant aspects of the draft agreement that remain applicable, as related to natural resource management, and supersedes any benefits of such an agreement.

A further goal of Marine Corps natural resources management is to manage natural resources to provide outdoor recreational opportunities, as appropriate. However, recreational opportunities at MCAS Miramar are limited by military operational and security needs, safety concerns, limited management staff to administer programs, and the relatively small land area with a finite resource base. Recreational activities dependent on developed facilities, such as equestrian facilities (e.g., horse riding in East Miramar, which is authorized on designated routes), are managed and operated by Marine Corps Community Services (MCCS) under their specific guidelines. A Remote Controlled Airplane Flyers Club and the San Diego Shotgun Sports Club operate under a special license from the Station providing access as dictated in their charters. Management of the Miramar Fish Pond is accomplished jointly with the Miramar MCCS managing recreational aspects and the Environmental Management Department providing technical support regarding fishery and water quality issues.

### **Management Issues**

Management issues at MCAS Miramar include determining the appropriate level of public access to allow for natural resource-dependent outdoor recreation on MCAS Miramar; implementing a program for such access; and integrating outdoor recreation with the operations and military mission of MCAS Miramar without compromising either. Proper management and supervision of outdoor recreation programs is needed to ensure that military safety and security requirements are met and natural resource damage is prevented. Without an increase in staffing, future development of natural resources-based outdoor recreation will be limited. Further, recreational access to undeveloped areas at MCAS Miramar is limited to a few activities that have been approved by the Committee for Land and Airspace Management Policy and/or the Commanding Officer.



*Fish Pond*

*Natural Resources Division*

Marine Corps policy is to permit off-road vehicle use only in areas and on trails designated by installation commanders. Unimproved roads must be monitored to prevent movement into sensitive areas (MCO P5090.2\_). MCAS Miramar does not have the staffing to implement such a program for recreational off-road



vehicle use that would include monitoring to ensure natural resources are not damaged.

As surrounding areas have become urbanized, there has been increasing interest from the public to access MCAS Miramar for natural resource-related field tours and other outdoor recreation. Requests for field tours are typically limited to granting about one per month due to staffing constraints. Requests for field trips need to be submitted to the Public Affairs Office at least 60 days in advance along with proof of liability insurance.

Compatibility of other outdoor recreational activities must meet:

- 1) military operational and security needs;
- 2) safety hazards, such as explosive safety distances, firing range surface danger zones, and aircraft operation compatible use/clear zones;
- 3) staffing limitations; and
- 4) requirements for resources conservation, which must be carefully evaluated and will continue to limit recreational access.

Implementation of any new outdoor recreational program would involve initial trial phases and will be limited to MCAS Miramar, Marine Corps Recruiting Depot, and local Marine Corps Recruiting personnel (active duty and DoD employees), their dependents, and guests. Initial trial phases are expected to last for two to three years. Following initial trial phases and a determination of surplus resource availability, access by the general public will be accommodated through lottery drawing.

### **Hunting and Fishing**

In 1963 the Navy completed a Cooperative Plan for Conservation and Development of Fish and Wildlife on NAS Miramar with signatures from representatives of the U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, and the California Department of Fish and Game. This cooperative plan clearly indicates that hunting and fishing were considered and anticipated to occur on the Station. This INRMP replaces the former requirement for a Cooperative Agreement or Plan.

Executive Order 12962, *Recreational Fisheries* directs federal departments, including DoD, to improve the quantity, function, and sustainable productivity of recreational fisheries for increased opportunities, when practical to do so. A main focus of NAS Miramar original plan for recreational fisheries that has been continuously maintained is the operation of a 7-acre pond in West Miramar (the Fish Pond) as a recreational fishery. Due to its limited size and management by MCCS, access has been limited to authorized MCCS patrons (Active Duty, Reservists, retired DoD members, civilian employees of MCAS Miramar, and family members).



The pond was stocked repeatedly with rainbow trout and warm water fishes over the years. This pond, however, was closed to fishing about 1990. The USFWS (1992b) concluded that, with management, the Fish Pond could support a viable recreational sport fishery for Station personnel. In 1998 the Station Installation Restoration Program concluded that no clean up action was required and recreational fishing would not be a human health risk. During the 1990s, conditions at the Fish Pond deteriorated due to lack of management, allowing strong eutrophication and dissolved oxygen problems. A shoreline, fishery, recreation facilities



restoration project was conducted (Green *et al.*, 2001) through a combined restoration effort of the Marine Support Squadron 373, Public Works Center (Southwest), MCCA, Environmental Management Department, and the Public Works Division. The Naval Consolidated Brig removed a considerable amount of vegetation and debris before opening of the pond. In May 2004 the Fish Pond was reopened at a dedication ceremony officiated by the MCAS Miramar Commanding General.

MCAS Miramar maintains a CDFG aquaculture permit, which allows fish stocking and removal (including fishing) without the requirement for individuals to possess a State fishing license. The MCCA Outdoor Recreation Center issues free fishing permits to authorized patrons, which have the aquaculture permit number to allow the transport of fish caught in the pond and support annual reporting requirements.

No formal hunting program has operated on the Station. Beginning in the mid-1980s, Navy natural resource staff initiated work toward development of a formal recreational hunting program involving archery deer and upland game hunting. This work showed that sufficient populations of deer, coyotes, and upland game (rabbits, quail, and doves) were present on the Station to support a limited hunting program (Hannon 1987). Changing priorities related to BRAC ceased any further work on this effort due to the transfer of the Station from the Navy to Marine Corps.

Since completion of the last INRMP, MCAS Miramar has determined that it is not currently feasible to develop and implement a recreational hunting program involving deer, coyotes, or upland game. Opportunities for such hunting would be extremely limited, and the Station does not have the personnel to operate such a program, which would require close monitoring of hunting.

### **7.7.2 Objective(s) and Planned Actions**

**Objective:** Provide outdoor recreation opportunities for MCAS Miramar personnel and the general public within constraints of the military mission and capability of the resources.

#### ***In-house Management Actions:***

- Provide technical assistance with fishery management at the Miramar Fish Pond.
- Maintain a CDFG Aquaculture Permit for the Miramar Fish Pond.
- Prepare natural resource information and briefings, as requested.

## **7.8 Geospatial Data Management**

### **7.8.1 Policy and Background**

In 2003 the Commandant of the Marine Corps released a document entitled *Guidance for Implementing GIS, CADD and Related Technologies for Installation Management*. This document serves to standardize GIS use within the Marine Corps and “*further the use of GIS as a viable tool to support Marine Corps installation management decisions and improve mission effectiveness.*”

The MCAS Miramar Environmental Management Department maintains a GIS database of Station environmental data, especially information on natural and cultural resources. The Natural Resources Division staffs the Environmental Management Department GIS position. Facilities GIS information is maintained by the Public Works Division who also has the lead for overall GIS development on the Station.

The Natural Resources Division has completed in recent years or is completing a number of projects (MCAS Miramar 2000) to improve its geospatial data program, including the following:

- is in the process of transferring GIS data into a Geodatabase format,
- developed and maintains a standard for GIS database dictionaries and associated metadata for all GIS usages, according to national standards (metadata requirements are added to all contracts),
- developed specific language that is included in all contracts to ensure that all spatial data produced are fully compatible with Natural Resources Division GIS databases,
- is completing the development of database information for existing GIS coverages,
- developed a standardized system for recording and mapping significant resource observations (plants, wildlife, erosion, damage, etc.) when incidentally encountered, and
- cleared the backlog of the creation of GIS data layers for natural and cultural resources from various reports and NEPA documents written for the Station.

The Natural Resources Division requires that Station natural and cultural resources be mapped with global positioning (GPS) technology whenever possible. The GPS data are then converted to GIS data in a format compatible with the current Natural Resource GIS database format. Most Station natural and cultural resource mapping is done by contractors as a contract deliverable using their own GPS units. However, the Natural Resource Division also has a GPS unit for mapping fire boundaries and incidental resources. It is the goal of the Natural Resources Division to continue providing current, up-to-date information on natural resources locations to managers and decision-makers.

### **7.8.2 Objective(s) and Planned Actions**

**Objective:** Maintain Station natural resources GIS database, ensuring all information is current and up-to-date; ensure that all GIS information is available to biologists, planners, contractors, and others in a quick and timely manner; and maintain an operational GPS unit to quickly and accurately map natural resources.

#### ***In-house Management Actions:***

- Ensure accurate and usable GIS deliverables from contracts.
- Manage and merge data from surveys and studies to support GIS users.
- Ensure equipment (GPS, printers, and plotters) are ready to use.
- Develop and update database information for all GIS layers.

#### ***Must Fund Project:***

Section 9.2.1, *INRMP Implementation Professional staffing* has a project, GIS/GPS Supplies, Equipment, and Maintenance (MI22202) that is important to this objective as well.

#### ***Other Planned Projects:***

- Aerial Photo/Imagery (MI1NR08), initiate in 2007.
- Aerial Photographs (MI65555), initiate in 2007.

## **7.9 Cultural Resources Considerations**

### **7.9.1 Policy and Background**

Cultural resources management at MCAS Miramar is provided in accordance with Section 106 and Section 110 of the National Historic Preservation Act (16 USC Section 470, as amended), the Archeological Resources Protection Act (16 USC Section 470aa-47011), the American Indian Religious Freedom Act (42

USC), the Native American Graves Protection and Repatriation Act (25 USC Section 3001 *et seq.*), Executive Order 11593 (*Protection and Enhancement of Cultural Environment*), DoD Directive 4710.1 (*Archeological and Historic Resources Management*, 1984), and U.S. Marine Corps policies. Means to achieve compliance with these laws and policies are outlined in the MCAS Integrated Cultural Resources Management Plan (MCAS Miramar ICRMP 2004).

Cultural resource management efforts at MCAS Miramar have accomplished or documented the completion of basic archaeological surveys for a large portion of undeveloped lands on Station and have evaluated a majority of the previously recorded archaeological sites for eligibility for the National Register of Historic Places, as required by the National Historic Preservation Act. About 17,600 acres (77% of the Station), including nearly all of East Miramar and the Miramar Mounds National Natural Landmark, have been adequately surveyed for cultural resources (Stewart 2003, Giacomini and Caudell 2004). As such, adequate survey information exists to mostly support natural resource, and other installation, management activities and operations.

### **Natural Resources Management Implications**

Few natural resources projects would have the potential to adversely affect significant archaeological sites because most activities associated with substantial soil disturbance would only occur on sites already degraded by historical activities. The environmental assessment associated with the development of this INRMP provides an assessment of the potential for cultural resources effects (undertakings) during INRMP implementation. If cultural resources may be impacted, steps must be taken to avoid or mitigate damage.

It is important to ensure that provisions of this INRMP are consistent with the protection of cultural resources. Prior to any ground-disturbing, natural resources activity, the Environmental Management Department will evaluate proposed activities for compliance with all appropriate cultural resources laws and regulations. Proposed projects will be submitted, as part of standard NEPA review, to the Cultural Resources Program Manager for approval, determinations of effect, and Section 106 consultation, as necessary. As a result, adequate information exists to support most natural resource and other installation management activities and operations.

***Vegetation and soils management.*** Of all practices associated with natural resources management on MCAS Miramar, vegetation restoration and erosion control projects have perhaps the greatest potential to disturb archeological sites. Any natural resources projects that involve excavation, earth moving, and/or fill deposition can damage or bury archeological sites.

***Wetland mitigation.*** The construction of compensatory wetlands, including vernal pool habitat, can involve moderate ground disturbance that can damage archeological sites.

## **7.9.2 Objective(s) and Planned Actions**

**Objective:** Implement this INRMP in a manner consistent with the protection of cultural resources at MCAS Miramar.

### ***In-house Management Action:***

- Ensure appropriate review of natural resource management projects by Cultural Resource Manager to ensure that adverse effects to archeological sites are avoided.

## **7.10 INRMP Planning**

### **7.10.1 Policy and Background**

This INRMP must be reviewed at least every five years, as stipulated by the Sikes Act and Marine Corps policy. The lists of objectives and planned projects and actions in Appendix E can be used to guide the review and adjust programs, per the adaptive management process.

### **7.10.2 Objective(s) and Planned Actions**

**Objective:** Review and update this INRMP at least every five years or when major changes are made to the natural resources program; coordinate this update with the USFWS and CDFG.

#### ***In-house Management Action:***

- Monitor and annually review implementation of this INRMP, as required by Marine Corps policy; report implementation progress; and record revisions necessary for the next INRMP update, annually.

#### ***Must Fund Project:***

- Prepare INRMP/Environmental Assessment (MI40225), initiate in 2009.